

ELECTRONIC CONTROLS, INC.



TYPICAL T-BAR® CIRCUIT MANAGEMENT APPLICATIONS

T-BAR® SWITCH/RELAY DIVISION FILE: GENERAL INFORMATION

A. Gang-Switching (Manual or Automatic Operation)

1. Interface switching e.g. connecting computers to various input or output peripheral equipment.
2. Multi-channel switching e.g. switching instrumentation from test cell to test cell or reactor controls from pile to pile.
3. Selecting Operate Mode e.g. selecting pre-wired program boards in electronic data processing machines.
4. Block Switching e.g. selection of a magnetic data storage drum or a tape handler out of a "library" of stored data.
5. Bypass and Standby Switching e.g. to isolate pieces of equipment for maintenance while switching in standby equipment.
6. Buffer Switching e.g. switching data into interim storage buffers as in numerical control where X, Y and Z dimensions are stored as they are read out from a line by line tape reader.
7. Matrix Selection e.g. selecting encoding or decoding matrices to transform incoming or outgoing digital data for common language machine applications.
8. Status Light Testing e.g. in simulators to see if any lights are burned out.
9. "All Call" Switching e.g. in intercom systems to talk to all stations at once.
10. Module Selection e.g. connecting reference modules in functional testers to energize black boxes and to supply go-no go references to comparator.
11. Monitor Switching e.g. to simultaneously switch video audio and tape recorder outputs to monitor circuits.



TYPICAL T-BAR® CIRCUIT MANAGEMENT
APPLICATIONS (Continued -2-)

T-BAR® SWITCH/RELAY DIVISION
FILE: GENERAL INFORMATION

B. Circuit Selection as in

- a. Relay Tree Random Switching (See 809)
 - b. Sequential Step Switching (See sketch)
 - c. "X-Y" Matrix or Cross-bar Random Switching (See 810)
1. Tape or Computer Controlled Switching e.g. T-Bar® Relay Trees are instructed directly in binary code to switch an input to any one of a multitude of outputs at random or vice versa. (Typical Applications) Automatic Checkout Systems, Complex Continuity Testers, Language Labs, Mixing Machines (Liquid or Powder), Automatic Assemblies.
 2. Tape or Computer Controlled Voltage Source e.g. T-Bar® Relay Trees with resistors across the outputs become binary controlled voltage dividers. (Typical Applications) Digital Power Supplies, Frequency Synthesizers, Process Controllers.
 3. Analog Data Sequential Sampling e.g. Stepper selected T-Bar®s with their negligible thermal junction voltages and relatively constant low contact resistance are ideal for sampling temperature and pressure transducer outputs to recorders and go-no go controllers
 4. Random Switching e.g. "X-Y" Matrix and Relay tree arrangements. (Typical Applications) All communication and test systems.
 5. Replacing Cross-Bar Switches e.g. there is almost no limit to the number of "select" or "hold" circuits or in the orientation of the switches to available space. Each X (select) or Y (hold) switch is a separate unit easily sealed or replaced and is wired into the circuit by connectors. "X-Y" matrices of thousands of cross points are practical.

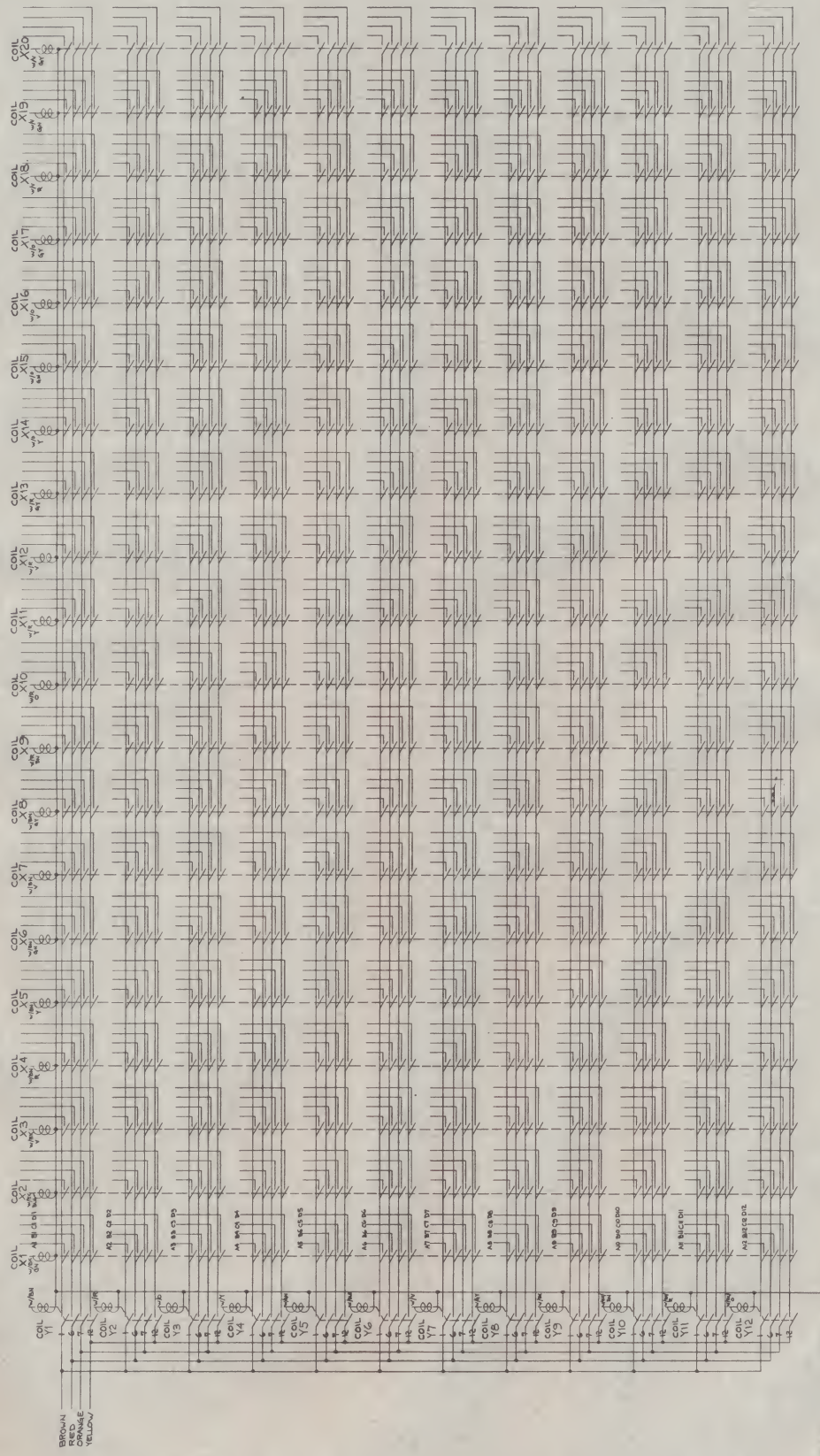
ELECTRONIC CONTROLS, INC.



T-BAR® APPLICATION DATA

"X-Y" MATRIX SWITCH (CROSSBAR)

- WANTED:** An equivalent to an F type 10 x 16, 6A deep crossbar switch for "X-Y" address to route a set of 6 parallel inputs to any one of 160 sets of 6 parallel outputs with an auxiliary "C" form contact on each "X" or "selector" coil. All coils are to be 6 VDC.
- SOLUTION:** Use (10) 801-6A/1C-6 and (15) 801-60A-6 T-Bar® Relays wired together using 88601 T-Bar Connectors as shown on the referenced Drawing C810-10x16-6A-6-G82, sheets 1 & 2.
- ADVANTAGES:** This T-Bar arrangement offers a significant set of advantages over competitive crossbar switches or reed relay assemblies, e.g.:
1. Smaller in size.
 2. Easily oriented to fit into tight spots.
 3. Lighter weight.
 4. Easily wired, installed and serviced.
 5. An almost unlimited choice of contact arrangements.
 6. Usually lower in hardware cost and installed cost.
 7. Easily sealed in repairable enclosures as an assembly, modules or individual sealed T-Bars.
 8. Faster operating speeds.
 9. Plus the general T-Bar features listed below:
 - a. Gold bonded into fine silver contacts standard
 1. 10 milliohm typical contact resistance
 2. Low junction thermal noise; less than .1 microvolt offset at room temperature
 3. Choice of other contact materials
 4. Switches up to 3 amps resistive and down to dry circuit in the microamp range
 - b. Low interelectrode capacitance; less than 1 pico-farad between contacts or any contact combinations. Coil easily shielded to eliminate electro-magnetic RFI.
 - c. Switches more circuits in less space than even solid state arrangement of comparable ratings.
 - d. Ease of mounting in any orientation; uses only (2) #6-32 screws; can mount easily on back of panels.
 - e. Easy to wire and pre-harness using T-Bar crimp contacts.
 - f. Contact is protected, dust-free enclosures.
 - g. A, B, C or D form contacts available.
 - h. Available to meet applicable portions of MIL-T-5757.



NOTE: TYPICAL TERMINAL IDENTIFICATION IS SHOWN ON RELAY Y1 AND X1-12.
ALL OTHER RELAYS FOLLOW THE SAME PATTERN.
FOR EXAMPLE: A1 MEANS POLE #1 ON WAFER 'A' OF

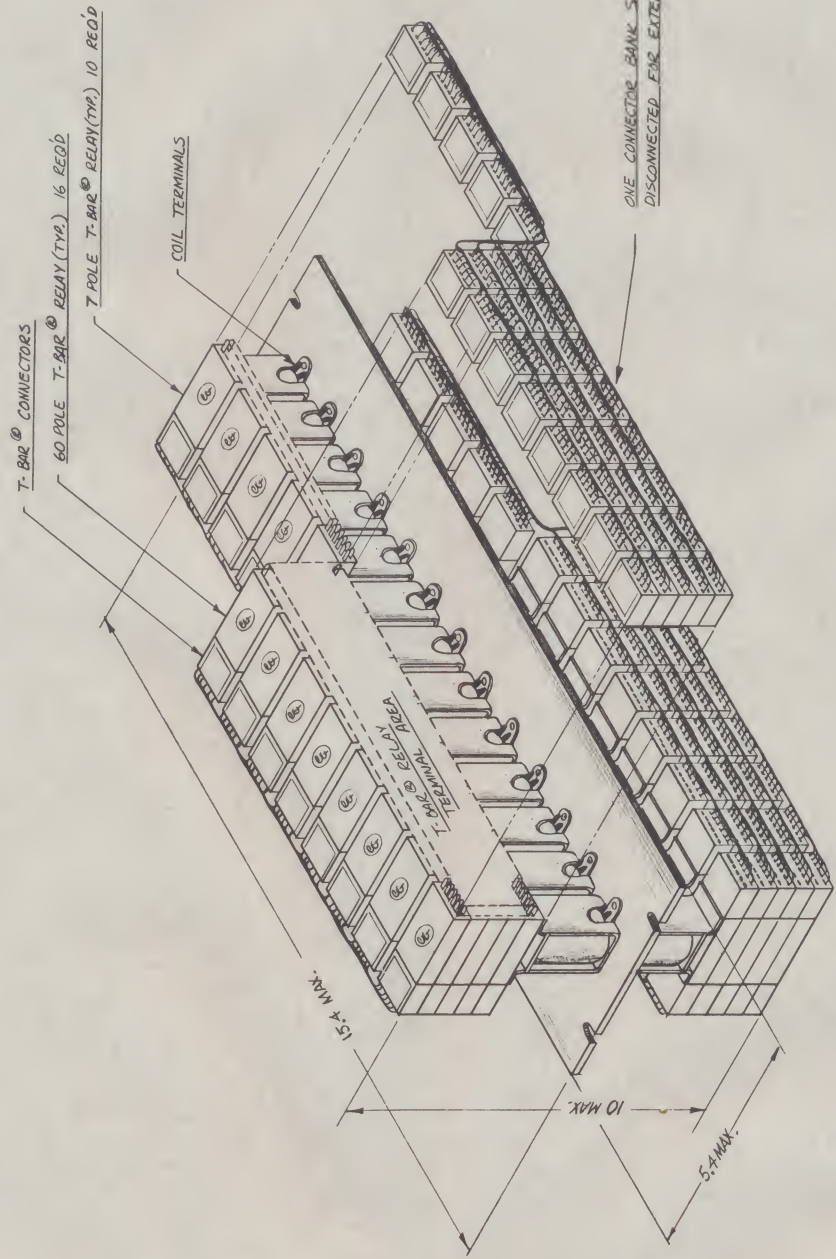
ITEM NO.	QTY/REF SYM	PART NUMBER	DESCRIPTION	VENDOR	SPECIFICATION/NOTE
LIST OF MATERIALS OR PARTS LIST					
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS IN PARENTHESES ARE FOR INFORMATION ONLY. DIMENSIONS IN PARENTHESES ARE FOR INFORMATION ONLY. DIMENSIONS IN PARENTHESES ARE FOR INFORMATION ONLY.					
DB10-12-20-4A-24	1	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY
X-Y MATRIX DB10-12-20-4A-24					
CODE IDENT NO. SIZE					
14195 D DB10-12-20-4A-24					
SCALE WT					
SHEET 2 OF 2					



- [illegible]

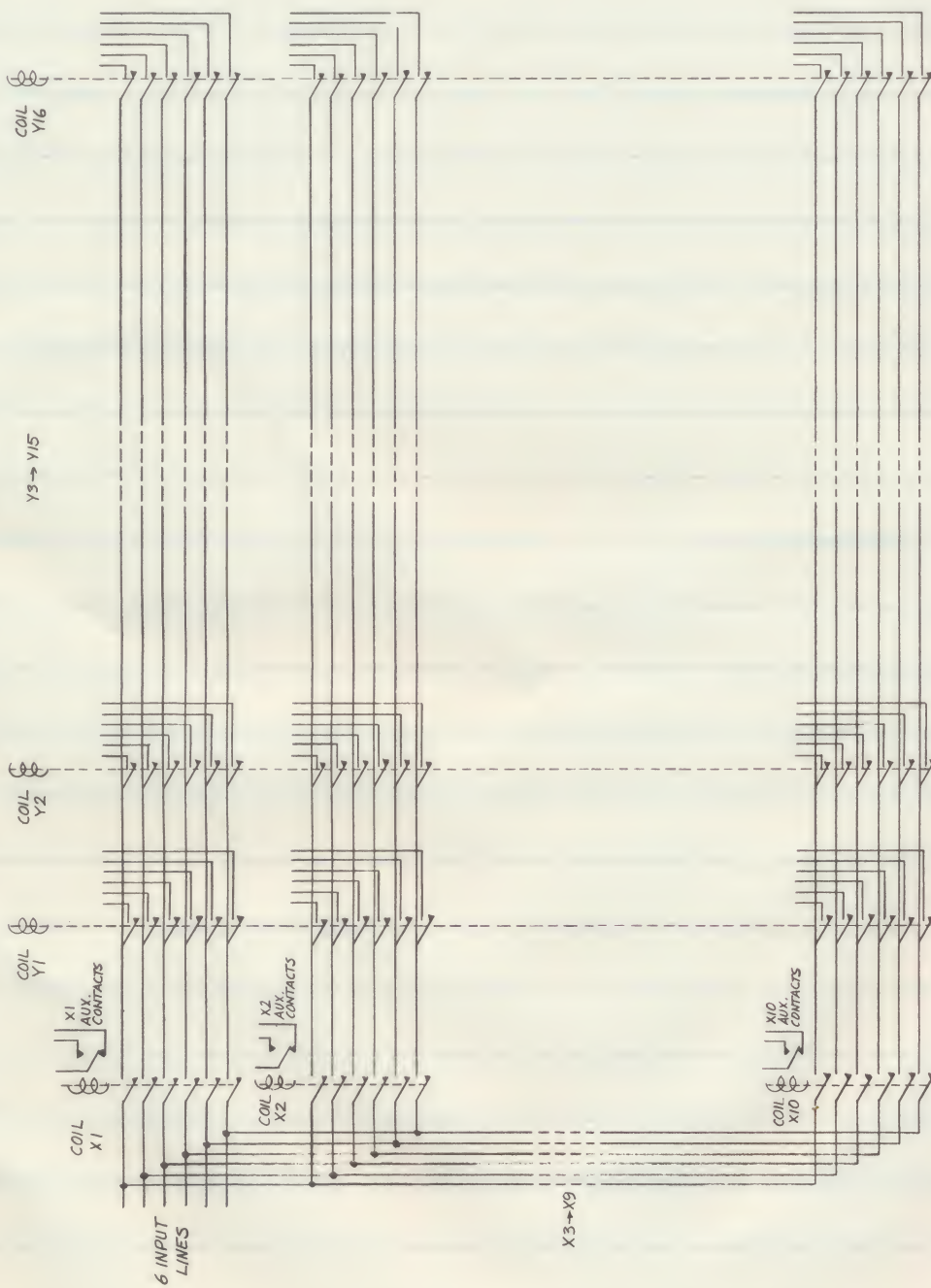
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REVISIONS		ECO		DATE		BY	
SYM	ZONE	DESCRIPTION					APPD



REV
C810-10x16-6A-6-68Z
SHEET 1 OF 2

ITEM NO.	QTY	REF SYM	PART NUMBER	DESCRIPTION	VENDOR	SPECIFICATION	NOTE
LIST OF MATERIALS OR PARTS LIST							
DSGN							
DWN							
CHK							
ENGR							
APPO							
REL							
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES REMOVE ALL SCRATCHES, BURS AND SHARP EDGES. ALL SURFACES SHALL BE FINISHED BY DRILLING, TURNING, GRINDING, OR SIZES AND MANUFACTURERS DIMENSIONS. TOLERANCES FRACTIONS DECIMALS ANGLES 8 1/64 0.005 8 1/2°				ELECTRONIC CONTROLS INCORPORATED STAMFORD, CONNECTICUT WILTON, CONNECTICUT			
MATERIAL				T-BAR @ 10x16x6A X-Y MATRIX			
FINISH				CODE IDENT NO. SIZE			
NEXT ASSY				14195 C			
USED ON				C810-10x16-6A-6-68Z			
APPLICATION				SCALE 1/2 WT			
				SHEET 1 OF 2			



REV
C810-10x16-6A-6-G82
SHEET 2 OF 2

ITEM NO.	QTY	REF SYM	PART NUMBER	DESCRIPTION	VENDOR	SPECIFICATION	NOTE
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES REMOVE ALL SCRATCHES, BURS AND SHARP EDGES. ALL DIMENSIONS ARE TO BE TAKEN FROM THE DRILLING, PUNCHING, COMMERCIAL STOCK SIZE AND MANUFACTURERS DIMENSIONS.				ELECTRONIC CONTROLS INCORPORATED STAMFORD, CONNECTICUT			
FRACTIONS TO DECIMALS ± 1/64 ± .005				WILTON, CONNECTICUT			
ANGLES ± 15.0°				SIMPLIFIED SCHEMATIC			
MATERIAL				10 x 16 x 6A X-Y MATRIX			
FINISH				CODE IDENT NO. SIZE			
NEXT ASSY USED ON				14195 C			
APPLICATION				C810-10x16-6A-6-G82			
SCALE				WT			
SHEET 2				OF 2			

ELECTRONIC CONTROLS, INC.



T-BAR APPLICATION DATA

(Selector Switch Manual or Automatic)

WANTED: A 40 position direct reading (digital display) selector switch for mounting in limited panel space (expandable to 100 steps, 6 decks).

SOLUTION: Combine a thumbwheel switch (manual) or digital readout stepping switch (automatic) with T-Bar® Switch/Relays as shown on the attached sketch.

ADVANTAGES: This arrangement combines all the advantages (see below) of using T-Bar Switch/Relays for switching with the added advantages of thumbwheel switches over rotary selector switches or multi-deck steppers, e.g.

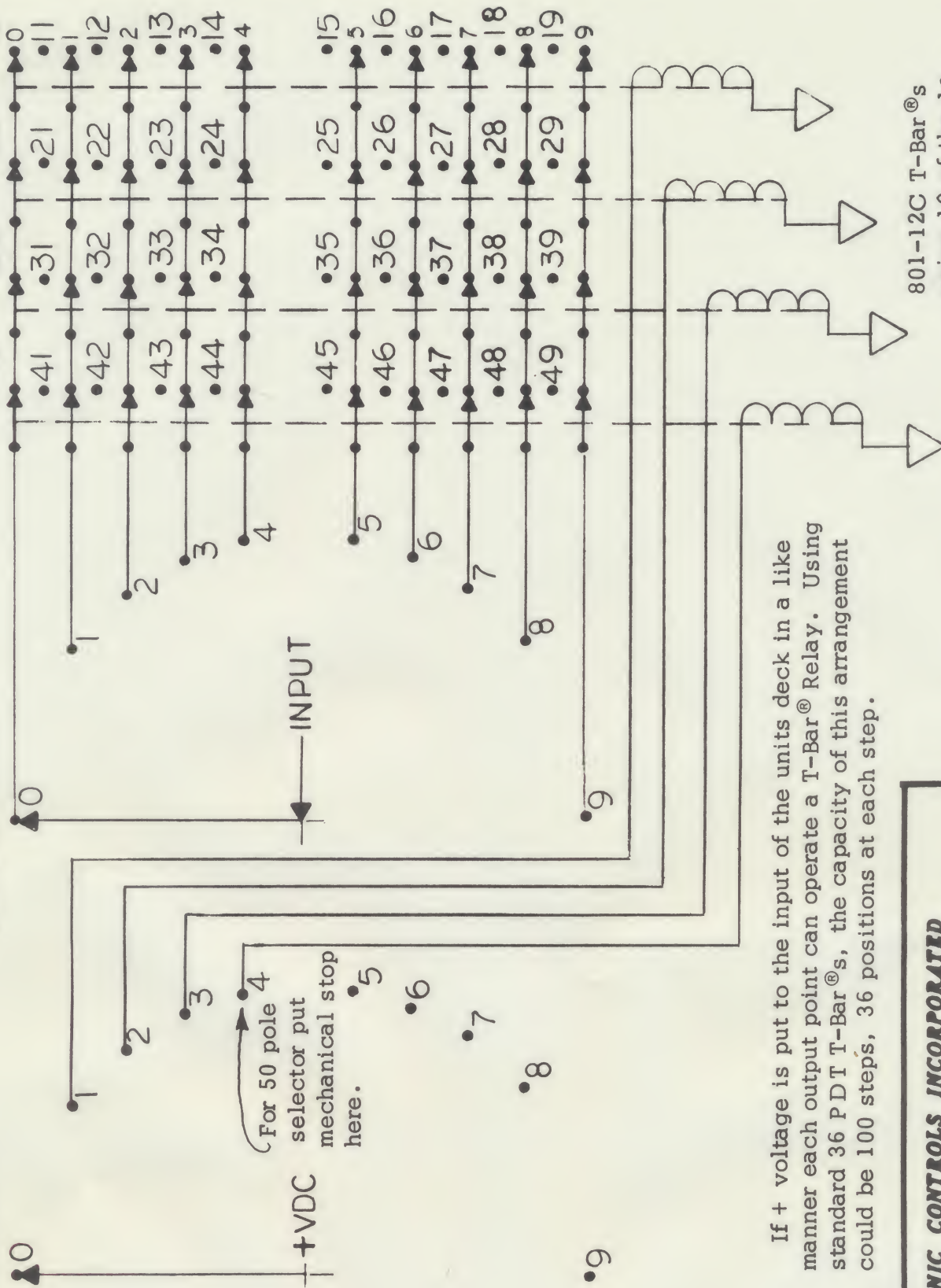
- A. Less panel space utilized.
- B. Easier to install, maintain, wire and package into equipment.
- C. Eliminates parallax in reading setting.
- D. Eliminates problems of aligning multi-step rotary indexing with panel markings.

GENERAL: (using T-Bar Switch/Relays and the T-Bar Connector)

1. Gold diffused into fine silver contacts are standard.
 - a. 10 milliohm typical contact resistance.
 - b. Low junction thermal noise; less than .1 microvolt offset at room temperature; easily heat shielded from coil temperatures in non-ventilated areas.
 - c. Choice of other contact materials.
 - d. Switches up to 3 amps resistive and down to dry circuits in the microamp range.
2. Low interelectrode capacitance; less than 1 picofarad between contacts or any contact combinations. Coil easily shielded to eliminated electromagnetic RFI.
3. Switches more circuits in less space than even solid state arrangements of comparable ratings.
4. Ease of mounting in any orientation; uses only (2) #6-32 screws; can mount easily on back panels.
5. Easy to wire and pre-harness using T-Bar 18 pin snap-in connector.
6. Protected, dust-free enclosed contacts.
7. A, B, C, or D form and bifurcated contact arrangements available.
8. Available to meet applicable portions of MIL-R-5757 open and sealed.
9. Fast switching 7.5 to 30 ms depending on number of contacts and their arrangement.

TENS DECK

UNITS DECK



If + voltage is put to the input of the units deck in a like manner each output point can operate a T-Bar® Relay. Using standard 36 P D T T-Bar®s, the capacity of this arrangement could be 100 steps, 36 positions at each step.

801-12C T-Bar®s using 10 of the 12 poles. 2 poles are available for indication or auxiliary.



ELECTRONIC CONTROLS INCORPORATED

STAMFORD, CONNECTICUT WILTON, CONNECTICUT

50 POSITION EXPANDABLE SELECTOR SWITCH
(MANUAL USING THUMB WHEEL SWITCH -
AUTOMATIC USING STEPPING SWITCH)



80104-12/65

T-BAR® ENGINEERING INFORMATIONCROSSTALK IN T-BAR® RELAYS AND SWITCHES

To demonstrate how T-Bar® Switches/Relays exhibit minimum crosstalk, the following analysis is presented:

CROSSTALK PATHS

Crosstalk has two primary paths in the T-Bar® wafer.

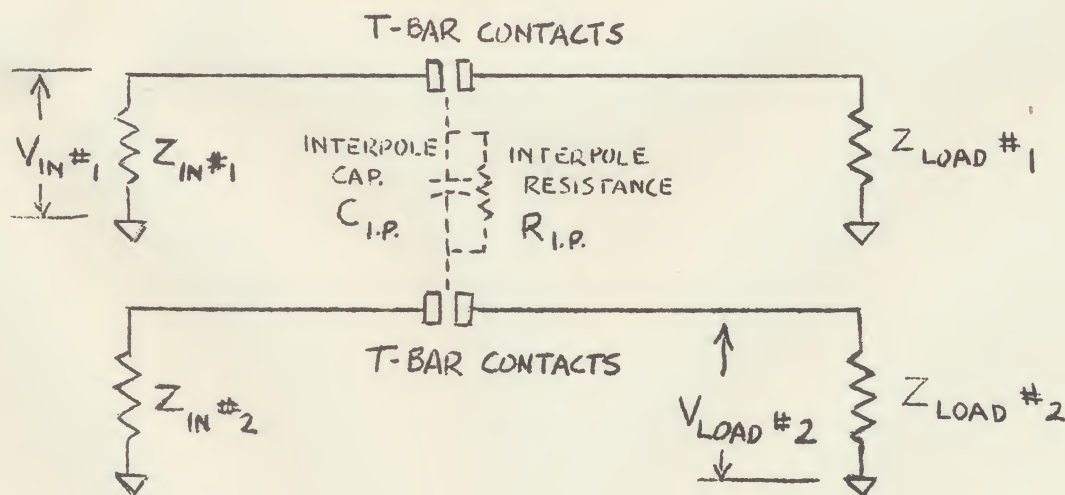
1. Interpole Capacitance
2. Interpole Leakage Resistance

The interpole capacitance can be measured and shown to be less than 0.25 pf.

The interpole leakage resistance can be measured and shown to be greater than 50,000 megohms (even after exposure to humidity).

For special applications the interpole leakage resistance can be kept greater than 1 million megohms.

Then the equivalent circuit can be drawn:





80104-12/65

Page 2 (continued)

Considering the crosstalk from circuit #1 into circuit #2:

$$Db = 10 \log_{10} \frac{P_1}{P_2} \quad \text{eg. (1)}$$

where $P_1 = \text{POWER IN } Z_{IN \#1}$, $P_2 = \text{POWER IN } Z_{LOAD \#2}$

$$\text{then } P_1 = \frac{(V_{IN \#1})^2}{Z_{IN \#1}} \quad \text{eg. (2)}$$

and

$$V_{LOAD \#2} = V_{IN \#1} \times \frac{Z_{LOAD \#2}}{\frac{R_{I.P.} \times \frac{1}{2\pi f C_{I.P.}}}{R_{I.P.} + \frac{1}{2\pi f C_{I.P.}}} + Z_{LOAD \#2}} \quad \text{eg. (3)}$$

This may be substituted into

$$P_2 = \frac{(V_{LOAD \#2})^2}{Z_{LOAD \#2}} \quad \text{eg. (4) and the}$$

Db's of crosstalk may be calculated.

Example: Switching a 2 Volt 10 mc video signal with input impedance of 100 ohms and load impedance of 10K ohms. calculate the crosstalk between adjacent poles in the T-Bar® wafer.

$$P_1 = \frac{(2)^2}{100} = .04 \text{ WATTS}$$

$$V_{LOAD \#2} = \frac{2 \times \frac{10 \times 10^3}{50 \times 10^9 \times \frac{1}{2\pi \times 10 \times 10^6 \times .25 \times 10^{-12}} + 10 \times 10^3}}{50 \times 10^9 + \frac{1}{2\pi \times 10 \times 10^6 \times .25 \times 10^{-12}}}$$

Here it can be seen that the interpole leakage resistance ($R_{I.P.} = 50 \times 10^9 \Omega$) is negligible.

$$V_{LOAD \#2} = .272 \text{ VOLTS}$$

$$P_2 = \frac{(.272)^2}{10 \times 10^3} = .0718 \times 10^{-4} \text{ WATTS}$$

$$Db_{CROSSTALK} = 10 \log_{10} \frac{.04}{.0718 \times 10^{-4}} = 37 Db$$

Showing that the crosstalk signal is 37 Db down from the original input signal.



80104-12/65

Page 3 (continued)

ALTERNATIVES:

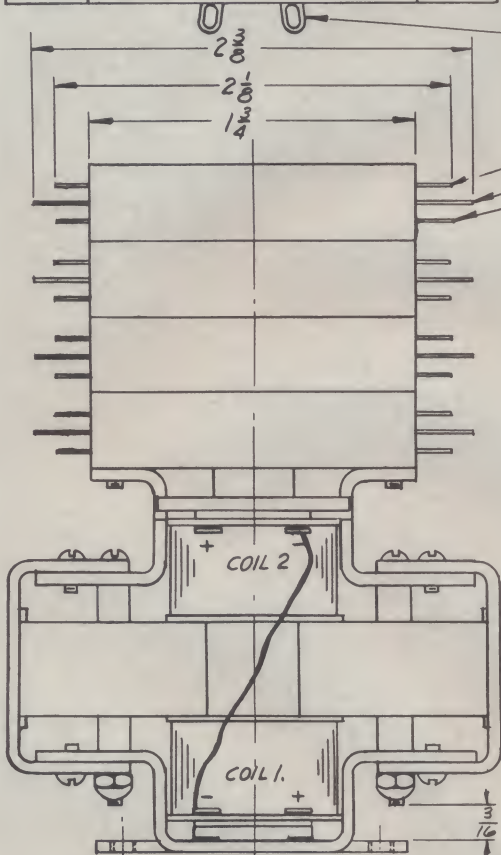
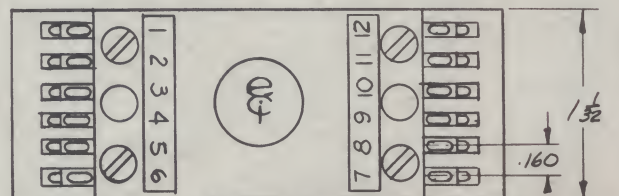
If this level of crosstalk is considered to be excessive, two simple alternatives exist:

1. Space poles further apart on the wafer ie. on a 12 pole wafer omit every other pole and use it as a 6 pole wafer. This results in about a 5:1 improvement in interpole capacitance and would reduce the crosstalk to about 52 db down for the example problem above. Note that further spacing between poles is possible as for example in a 4 pole wafer where there is one pole in each corner of the wafer.
2. Separate circuits by a non-used pole which is tied to ground. Here the grounded pole will serve as a shield and substantially bypasses the crosstalk to ground thereby providing another order of magnitude of improvements in crosstalk.

Prepared by:
Henry R. Angel,
Chief Engineer
December 1965

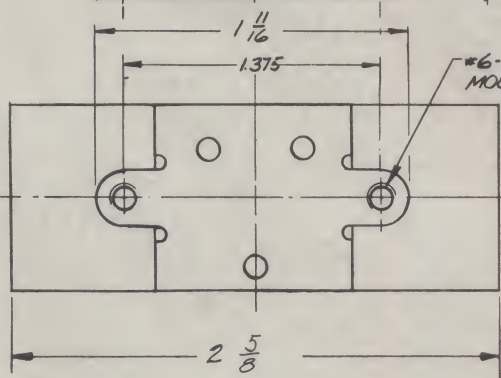
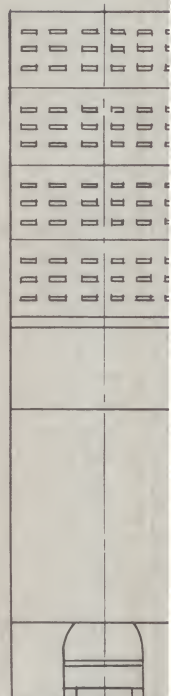
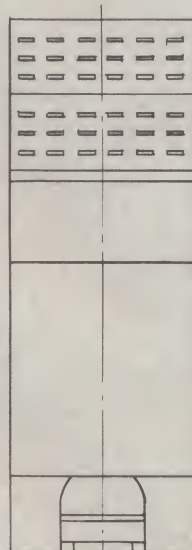
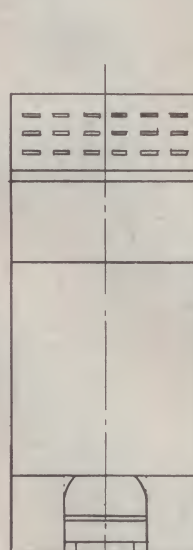
SERIES 801L T-BAR RELAY COIL CHARACTERISTICS.			
VOLTAGE VDC.	12 TO 60 POLES 1,2,3,4 & 5 WAFER RELAYS		
	RESISTANCE OHMS*	CURRENT AMPS**	POWER WATTS***
6	3	1.00	6
12	12	.50	6
24	48	.25	6
28	66	.225	6
48	195	.125	6
110	1000	.054	6

* RESISTANCE OF EACH OF THE COILS
 ** CURRENT WHEN USED IN CIRCUIT 1 AS SHOWN.
 *** TOTAL POWER WHEN USED IN CIRCUIT 1 AS SHOWN.



COIL TERMINALS(4)
 (1/16 x 3/16 SLOTS)

CLOSED IN LATCHED POSITION.
 COMMON.
 CLOSED IN UNLATCHED POSITION.



SPECIFICATIONS

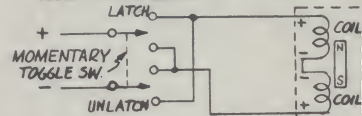
THE T-BAR® SERIES 801L T-BAR® MAGNETIC LATCHING RELAY IS AVAILABLE IN 12 TO 60 POLES IN INCREMENTS OF 4 POLES. ASIDE FROM THE SERIES 801 RELAYS.

A POWERFUL MAGNETIC LATCH HOLDS THE CONTACTS WITHOUT ANY ELECTRICAL POWER TO THE COILS, EXCEPT THE POLARITY OF THE D.C. POWER TO THE COILS. (COIL 1 AND COIL 2) WILL CAUSE IT TO UNLATCH.

TYPICAL APPLICATION CIRCUITS ARE SHOWN BELOW:

CKT. 1

SERIES CONNECTION



CKT. 2

A.C. OPERATION

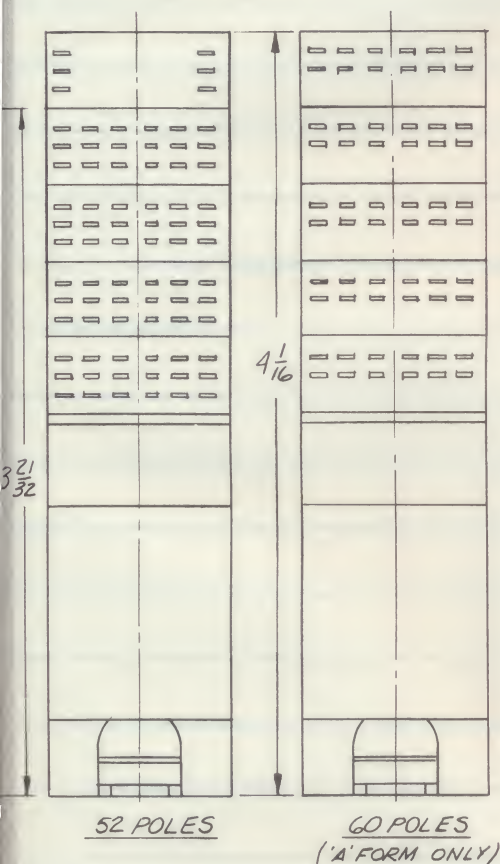


AYS ARE UNIQUE MULTICIRCUIT RELAYS THAT ARE OFFERED WITH THE LATCHING SOLENOID THE 801L IS SIMILAR TO THE T-BAR®

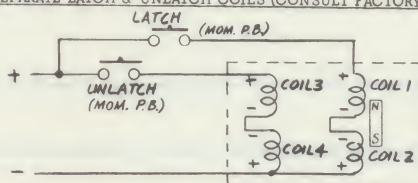
EITHER OF THEIR TWO STABLE POSITIONS (LATCHED OR UNLATCHED) DURING TRANSFER. THE RELAY CHANGES STATE SIMPLY BY REVERSING COIL 1 AND ⊖ TO COIL 2 WILL CAUSE IT TO LATCH. ⊖ TO COIL 1

THIS CIRCUIT REQUIRES THE LEAST AMOUNT OF D.C. POWER TO TRANSFER. POWER MAY BE LEFT ON CONTINUOUSLY IF DESIRED.

801L LATCHING RELAYS MAY BE USED FOR A.C. OPERATION BY USING A FULL WAVE BRIDGE RECTIFIER TO SUPPLY THE D.C. POWER. THE NOMINAL A.C. VOLTAGE REQUIRED IS THE SAME AS THE D.C. RATING OF THE RELAY, I.E., A 110 VDC UNIT MAY BE USED AT 115 VAC WITH A FULL WAVE RECTIFIER.

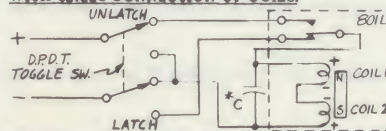


CKT. 3 SEPARATE LATCH & UNLATCH COILS (CONSULT FACTORY FOR THIS APPLICATION).



CKT. 4 SELF INTERRUPTING

WITH SERIES CONNECTION OF COILS



THIS CIRCUIT AUTOMATICALLY DISCONNECTS THE COIL POWER DURING TRANSFER, THEREBY MAINTAINING POWER DRAIN AT A MINIMUM. IT MAY BE USED WITH A.C. OPERATION OR D.C. OPERATION.

* C = NON-POLAR CAPACITOR; 50 MFD. FOR 28V COIL

TERMINALS: SOLDER TAB THAT ALSO MATES WITH T-BAR® CONNECTOR P/N 88601. SILVER PLATED STANDARD, GOLD PLATED AVAILABLE. SEE ORDERING INFORMATION BELOW.

CONTACT FORMS: "A" SINGLE THROW, NORMALLY OPEN (12 TO 60 POLES); OR "C" DOUBLE THROW, BREAK BEFORE MAKE (12 TO 52 POLES).

CONTACT MATERIAL: GOLD BONDED FINE SILVER STANDARD, SPECIAL DOUBLE GOLD BONDED WITH RHODIUM INTERFACE AVAILABLE FOR EXTRA LOW LEVEL CIRCUITS. SEE ORDERING INFORMATION BELOW.

CONTACT RATING: MICROVOLTS TO 1000 VDC, RESISTIVE LOAD 5 AMPS @ 115 VAC MAX. MAKE OR BREAK; 5 AMPS 500 WATT MAX. CARRY, EACH CONTACT. DERATE FOR INDUCTIVE LOADS.

LIFE: (TYPICAL @ 20 CPM)	MECHANICAL:	30,000,000	
	ELECTRICAL:	20,000,000	@ 100 MILLIWATTS
		200,000	@ 150 WATTS, 3 AMPS RESISTIVE
		100,000	@ 5 AMPS, 115 VAC

CONTACT RESISTANCE: (TYPICAL BEFORE/AFTER LIFE) 10/20 MILLIOHMS.

COIL CHARACTERISTICS: SEE CHART.

INTER-CONTACT GAP: BETWEEN CONTACTS OR CONTACT AND FRAME: 0.25 PF MAX., BETWEEN COIL AND FRAME: 6 PF MAX.

DIELECTRIC: 1000 VRMS @ SEA LEVEL TERMINAL TO TERMINAL, TO CASE AND CASE TO COIL. HIGHER ON SPECIAL ORDER.

INSULATION RESISTANCE: 5000 MEGOHMS MIN. @ 25°C; 50,000 MEGOHMS MIN. AVAILABLE.

ENCLOSURE: CONTACTS ENCLOSED IN DUST TIGHT PLASTIC ENCLOSURE THAT IS SEPARATED FROM THE ACTUATOR ASSEMBLY. WITHSTANDS MIL-STD-202 METHOD 106B MOISTURE RESISTANCE TEST. FOR ENVIRONMENTAL SEALS AND HERMETIC SEALS REFER TO SERIES 831L AND 808L RESPECTIVELY.

WEIGHT: 12 POLES: 10 OZ., 24 POLES: 11 OZ., 36 POLES: 12 OZ., 48 POLES: 13 OZ., 60 POLES: 14 OZ.

TEMPERATURE: -55°C TO +85°C.

MAX. VOLTAGE TO TRANSFER AND PULSE TIME: 80% OF NOMINAL @ 25°C; 20 MS. MIN. PULSE @ NOMINAL VOLTAGE.

VIBRATION: 10 TO 55 CPS AT .06" TOTAL EXCURSION PER MIL-STD-202C, METHOD 201A. FOR HIGHER VIBRATION LEVELS REFER TO SERIES 801LV LATCHING RELAYS.

SHOCK: 15 G's. FOR HIGHER SHOCK LEVELS REFER TO SERIES 801LV LATCHING RELAYS.

ORDERING INFORMATION: SPECIFY 801L - NUMBER OF POLES PLUS CONTACT FORM LETTER - COIL VOLTAGE (SEE CHART). EXAMPLE: A 36 POLE DOUBLE THROW LATCHING RELAY WITH 28 VOLT COILS IS: 801L-36C-28.

- NOTES:
- GOLD PLATED TERMINAL ADD "G" AFTER 801L (801LG).
 - FOR DOUBLE GOLD BONDED FINE SILVER CONTACTS WITH RHODIUM INTERFACE ADD "R" AFTER NUMBER OF POLES AND CONTACT FORM LETTER (801L-36CR-28).

SERIES 801L REV

ITEM NO.	QTY	REF SYM	PART NUMBER	DESCRIPTION	VENDOR	SPECIFICATION	NOTE
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES REMOVE ALL SCRATCHES, BURRS AND SHARP EDGES. TOLERANCES BELOW DO NOT APPLY TO DRILLING, PUNCHING, COMMERCIAL STOCK SIZES AND MANUFACTURERS DIMENSIONS.				<div style="display: flex; justify-content: space-between;"> <div> <p>DSGN</p> <p>DWN <i>T.B</i></p> <p>CHK</p> <p>ENGR <i>W.D</i></p> <p>APPD</p> <p>REL</p> </div> <div> <p>2-10-67</p> <p>2-13-67</p> </div> </div>			
<p>FRACTIONS 1/64</p> <p>TOLERANCES DECIMALS .005</p> <p>ANGLES 1° 0'</p>				<p>ELECTRONIC CONTROLS INCORPORATED</p> <p>STAMFORD, CONNECTICUT WILTON, CONNECTICUT</p> <p>T-BAR® MAGNETIC LATCHING RELAY (12 TO 60 POLES)</p>			
MATERIAL				<p>CODE IDENT NO. 14195</p> <p>SIZE D</p> <p>SERIES 801L</p>			
FINISH				<p>SCALE 2/1</p> <p>WT</p> <p>SHEET / OF /</p>			
NEXT ASSY				USED ON APPLICATION			



SUBJECT: SEALED ENCLOSURES

Enclosed (Dust-tight), Environmental, and Hermetic
We are taking this opportunity to attempt, in some measure, to clear up a recurring question asked us by our representatives and customers.

"What is the difference between an open, enclosed, environmentally sealed, and hermetically sealed relay?"

The difference is one of definition and what seal tests are applicable.

The definition and differences can best be emphasized by referring back to MIL-R-5757D, Paragraph 1.2.1.2, entitled "Enclosures." The enclosure specifically refers to the cavity which incorporates the relay contacts. Four classes are identified (but unfortunately not described and consequently the confusion). They are identified as:

TYPE	EXAMPLE
1 Open	Not Applicable to T-Bar®
2 Enclosed	T-Bar® Series 801
3 Sealed (other than hermetically)	T-Bar® Series 831
4 Hermetically Sealed (by fusion or soldering)	T-Bar® Series 808

The only restriction in the spec insisting on the use of Type 4 Relays occurs in paragraph 6.6 entitled

"Airborne Applications." This paragraph specifies that only relays meeting Sealing Test III, which is reserved in paragraph 4.2.7.3 for Type 4 relays, may be used. Only Series 808 could be considered in airborne applications.

If this be the case, then what are the other considerations to be included in selecting the enclosure.

Essentially, these are humidity, sand and dust, moisture resistance, splash proof and explosion proof. MIL-R-5757 makes reference only to salt spray and moisture resistance.

T-Bar® series 801 has met the moisture resistance test per MIL-STD-202, Method 106 referenced in MIL-R-5757 which is essentially a severe humidity test including temperature cycling from freezing (14°F) to high temperature (159°F) and vibration where the humidity runs to condensation. This test is run over 10 days. Although not required to operate in this environment, the T-Bar®s must meet all the operating specifications before and after this test.

However the question then arises—"Why series 831?"

Series 831 offers protection against corrosive atmospheres, splashing water and those applications

where the T-Bar®s must operate while under 100% humidity.

Series 831 is also needed where the customer specifies sealing test #1 and Series 808 when the customer specifies sealing test #2, which is a bubble test under vacuum per paragraph 4.7.2.1. and 4.7.2.2. which series 801 will not pass. Both tests are the same but in test #1 the test lasts only one minute rather than 8 hours and failure is observed only by bubbles escaping.

In seal test #2, the unit must be under water under a vacuum for 4 hours then, while still under water, held at ambient room pressure for another 4 hours. If any damage occurred under vacuum, water would be sucked into the unit during the second 4 hours. The unit, after the 8 hours, is disassembled to see if any water entered.

The only other time, other than airborne applications, where series 808 may be desirable occurs when the unit must operate under condensation with high insulation resistance at the terminals as well as the contacts, and it is difficult or impractical to pot the solder connections or gasket the T-Bar connectors. Then environmentally sealed MS connectors used with Series 808 T-Bar®s may be more practical.

COMPARATIVE SPECIFICATIONS:

Number of Poles Maximum:

Functional:

Thermal Shock:

Vibration:

Shock/Operational:

Shock/Non-Operational:

Altitude:

Salt Spray:

Humidity (contacts):

Moisture Resistance:

Sand & Dust:

Fungus:

Explosion Proof:

Mating Connector:

ENVIRONMENTALLY SEALED T-BAR® SERIES 831 RELAYS

48 "C" or 60 "A"

Same as Series 801 (2)

Class A —55°C to +85°C

GR. 1, 10 to 55 cps @ 10G (3) to 36p

GR1 15 G no chatter beyond 10 ms

30 G (4)

Altitude:

8,000 ft.

Salt Spray:

MIL-STD-202 Method 101B

100%

Moisture Resistance:

MIL-STD-202 Method 106B

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

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Per MIL-T-21200

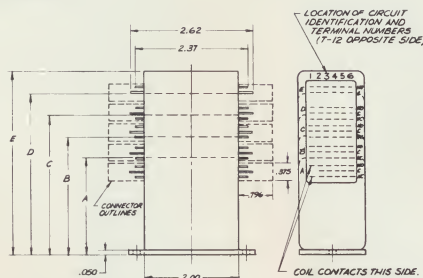
Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200



NO. OF POLES	A	B	C	D	E	COIL CURRENT (mA)	DC RESISTANCE (Ω)	OPERATE/RELEASE TIME (ms)	WEIGHT
11	2.14					109 mA	258 Ω @ 100%	15 ms / 10 ms	10 oz
23	3.11					123 mA	227 Ω @ 100%	25 ms / 5 ms	15 oz
35		3.52				127 mA	150 Ω @ 100%	30 ms / 5 ms	16 oz
47			3.80			233 mA	120 Ω @ 100%	35 ms / 5 ms	16 oz
59				4.53		233 mA	120 Ω @ 100%	40 ms / 5 ms	17.5 oz

HERMETICALLY SEALED T-BAR® SERIES 808 RELAYS

50 "A" or 34 "C"

Same as Series 801 (2)

Class A —55°C to +85°C

GR.1, 10 to 55 cps @ 10G (3)

GR(1) 15G no chatter beyond 10 ms

30 G (4)

Altitude:

50,000 ft.

Salt Spray:

MIL-STD-202 Method 101B

100%

Moisture Resistance:

MIL-STD-202 Method 106B

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

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Per MIL-T-21200

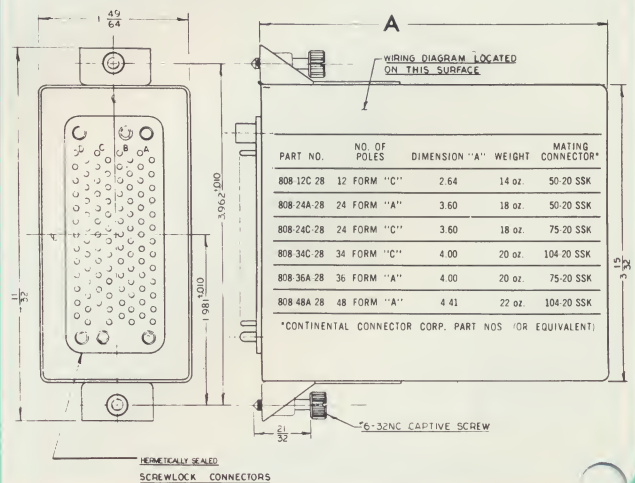
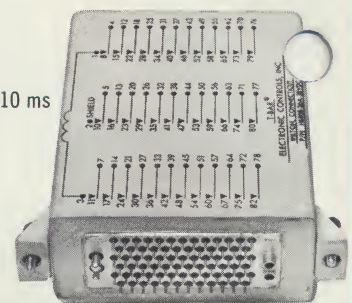
Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200

Per MIL-T-21200



MANUFACTURED BY:

electronic controls, inc.

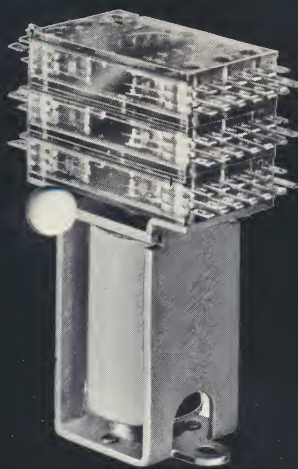
T-Bar Switch/Relay Div. • Danbury Road, Wilton, Conn. • (203) 762-8351


Manufactured under 1 or more of the following patents: 3,206,990, 3,226,508

© "T-Bar" — Reg. T.M.

Form No. TB801

Printed in U.S.A.



electronic
controls, inc. 

T-BAR® Switches

Switch up to 144 PDT ... in less space!

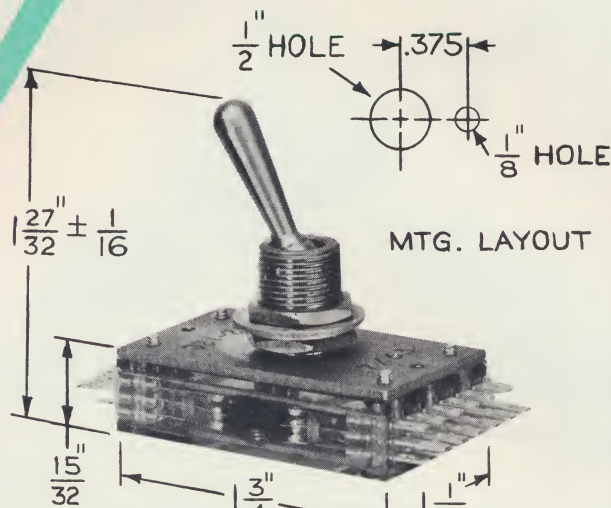
T-BARS®

are for Switching in

- COMPUTERS
- AUTOMATIC TESTERS
- COMMUNICATIONS
- PROCESS CONTROLS
- TELEMETRY
- GROUND SUPPORT EQUIPMENT
- AIRCRAFT

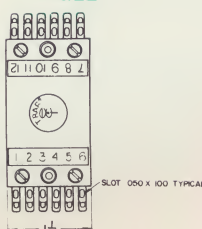
... almost everywhere!

BAT HANDLE T-BAR® SERIES 802 SWITCHES

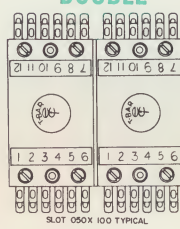


MTG. LAYOUT

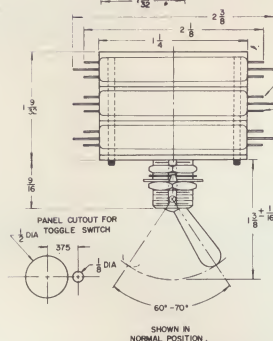
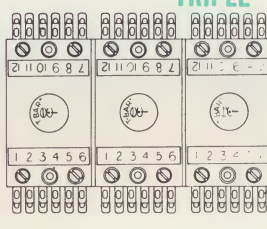
SINGLE



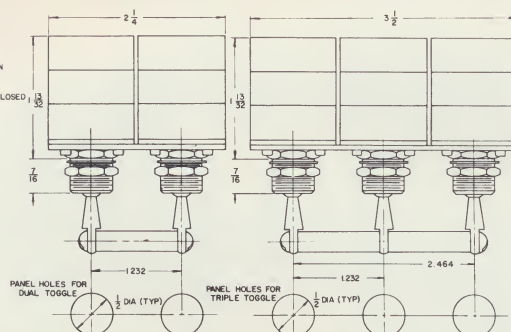
DOUBLE



TRIPLE

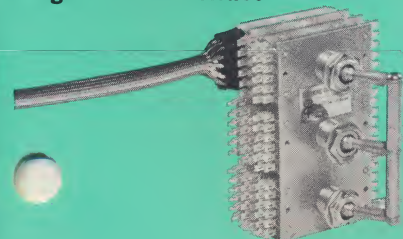


Part No.	Weight (oz.)
802-4C	1.7
802-8C	1.7
802-12C	1.7
802-24C	2.5
802-36C	3.3



Part No.	Weight (oz.)	Part No.	Weight (oz.)	Part No.	Weight (oz.)
802-48C	5.4	802-84C	8.9		
802-60C	6.2	802-96C	9.7		
802-72C	7.0	802-108C	10.5		

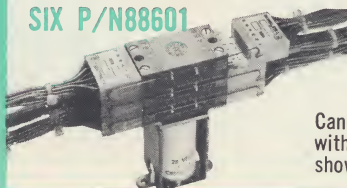
Ganged T-Bar Switches



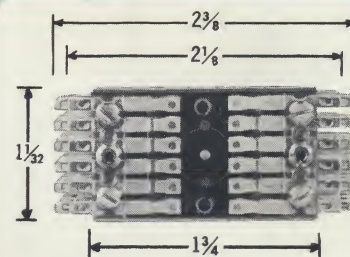
Toggles may be ganged for controlling additional circuits ... 48, 72, 108, etc. Shown here, 108 poles.

TBAR Connectors save time and reduce installation costs using individual snap-in crimp terminals crimped to pre-stripped wire and then snapped into a contact block, which forms the connector. The connector is pushed onto the wafer terminals, eliminating soldering. Because we offer a connector, rather than a receptacle, harness work can be completed outside the chassis and therefore no fancy chassis work is required to accept a receptacle. It not only makes the metal work simpler, but it also saves layout engineering and drafting time. Since T-Bar Switch/Relays are so easily mounted, they are often found on the back of meter panels or on their own brackets.

SIX P/N88601



Can be used with all units shown above



SPECIFICATIONS

T-BAR® Switches are reliable high-density, multi-pole switches with a unique design permitting stack-up of enclosed contact "wafer." Each wafer has a maximum of 12 pole double throw contacts thereby allowing E-C-I to supply with any combination from 4 to 144 PDT.

Terminals: (Silver Plated)

Solder tab, that also mates with T-Bar® connector P/N 88601 (two required per wafer). Gold plated terminals available.

Contact Forms:

- "A" single throw N.O.
- "B" single throw N.C.
- "C" double throw, break before make
- "D" double throw, make before break

Contact Material:

Gold bonded fine silver, standard

Contact Rating:

Microvolts to 1000 VDC, resistive load 5 amps; 5 amp @ 28VDC or 115VAC

Contact Life: (Typical @ 20 cpm)

Mechanical: 50,000 (802, 832) 500,000 (803)

Electrical:

50,000 @ 5 amps, 28VDC, or 115VAC, resistive
Derate between 40 to 60% for inductive loads and tungsten lamp loads.
Other contact ratings available with non-standard contacts on request

Contact Resistance: (Typical before/after life)

Dry Circuit: 10/20 milliohms @ 1 mv, 1 micro amp resistive
Normal Circuit: 10/20 milliohms @ 105 v, 100 ma resistive
High Current: 10/30 milliohms @ 2A, 28 VDC

Inter-Contact Capacitance: (Maximum)

N.O. contact to common: 0.25 pf
#11 common to #12 common: 0.20 pf
N.C. and Frame #12: 0.25 pf
N.O. and Frame #12: 0.20 pf
N.O. on A to N.C. on B: 0.15 pf

Dielectric:

1000 VRMS @ sea level terminal to terminal, to plate. Higher on special order.

Insulation Resistance:

5000 megohms min. @ 25°C 50,000 megohms min. on request. Higher on special order.

Enclosure:

Contacts enclosed in dust tight plastic enclosure, that is separated from the actuator assembly. Withstands MIL STD-202 method 106B moisture resistance test. Other enclosures described under Series 832.

Temperature:

-55°C to +85°C

Humidity:

MIL-STD-202, Method 106B moisture resistance

Vibration:

Operation: 10 to 55 cps @ 10 g standard 10 to 500 cps on request

Shock:

Operating: 15 g (no contact chatter in excess of 10 ms.)
Non-Operating: MIL-S-901 High Shock Test with special mounting at C.G.

Ordering Information:

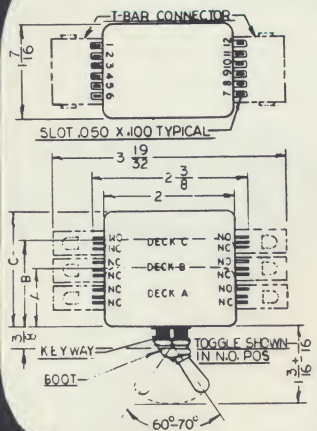
Specify Series No. — number of poles plus contact form letter. example: a 36 pole double throw toggle switch is 802-36C.

REPRESENTED BY:



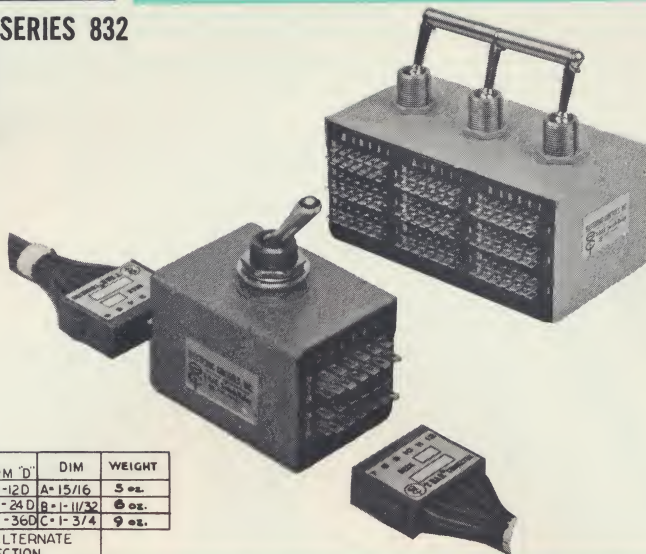
ENVIRONMENTALLY
SEALED

T-BAR SERIES 832 SWITCHES



NO OF POLES	PART NO.	FORM 'C' FORM 'D'	DIM	WEIGHT
12	832-12C	832-12D	A=15/16	5 oz.
24	832-24C	832-24D	B=1-11/32	8 oz.
36	832-36C	832-36D	C=1-3/4	9 oz.

ADD -1 TO P/N FOR ALTERNATE TOGGLE DIRECTION



Specifications: Similar to 802 (see other side). Available to 144 PDT on special order.

ENVIRONMENTAL

General: The unit is designed to be environmentally sealed to be splash proof and withstand humidity, salt spray, and fungus proof per MIL-E-5400E.

Temperature: -54° to +85°C

Altitude: 50,000 feet

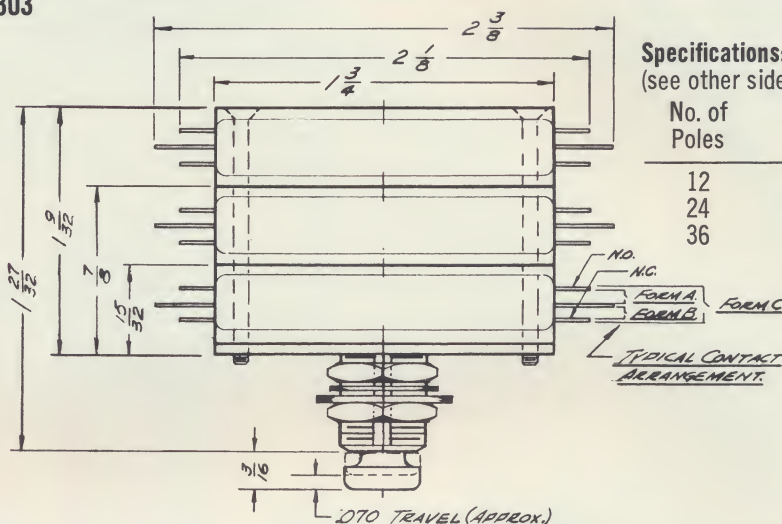
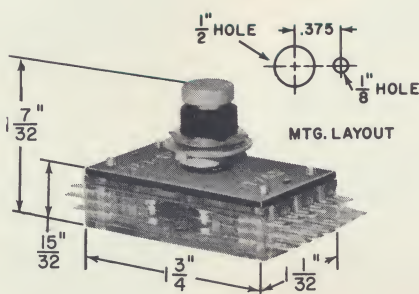
Vibration: Per MIL-E-5422E Curve 4

Shock: Per MIL-E-5422E

Explosion Proof: Per MIL-E-5422E

MOMENTARY
PUSH BUTTON

T-BAR SERIES 803 SWITCHES



Specifications: similar to 802 (see other side)

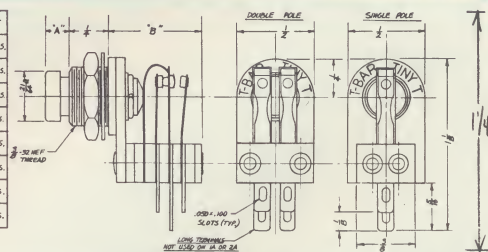
No. of Poles	Weights Oz. Approx.
12	2.0
24	2.5
36	3.0

MINIATURE
PUSH BUTTON

T-BAR SERIES 83 SWITCHES



PART NO.	CONTACT ARRANGEMENT	DIMENSIONS	WEIGHT
83-1A	SINGLE "BREAK"	3/16" x 7/16"	5 OZ. 7 GMS.
83-1B	SINGLE "BREAK"	3/16" x 7/16"	6 OZ. 8 GMS.
83-1C	SINGLE "BREAK-MAKE"	3/16" x 7/16"	6 OZ. 9 GMS.
83-1D	SINGLE "BREAK-MAKE"	3/16" x 7/16"	6 OZ. 9 GMS.
83-1F	SINGLE "WAVE MAKE"	3/16" x 7/16"	6 OZ. 9 GMS.
83-2A	DOUBLE "BREAK"	3/16" x 7/16"	5 OZ. 7 GMS.
83-2B	DOUBLE "BREAK"	3/16" x 7/16"	10 OZ. 9 GMS.
83-2C	DOUBLE "BREAK-MAKE"	3/16" x 7/16"	10 OZ. 9 GMS.



T-Bar® "Tiny-T" Momentary Pushbutton Switches are available in many contact variations. These reliable switches offer many important features as listed below:

1. Contact blades are stacked with plastic insulating spacers and sleeves. This arrangement provides locked-in blades and terminals with high insulation resistance.
2. One piece molded shaft and pushbutton allows the button to be inserted through the panel without disassembling the switch. Standard buttons are black; red also available.

3. Contacts are gold bonded, fine silver with low contact resistance (50 milliohms max.) for low level switching or up to 3 amp, 115 VAC non-inductive loads.

4. **Mounting hardware:** Supplied with (1) brass, nickel plated nut and (1) nickel plated internal tooth lock washer.

5. Other contact arrangements available in production quantities on special order.

6. Ordering information: Specify part number (see chart). Add - R for red pushbutton.

MANUFACTURED BY:

electronic controls, inc.

T-Bar Switch/Relay Div. • Danbury Road, Wilton, Conn. • (203) 762-8351

Manufactured under 1 or more of the following patents: 3,206,990, 3,226,508

® "T-Bar" — Reg. T.M.

Form No. TB802/3

Printed in U.S.A.

ELECTRONIC CONTROLS, INC.



T-Bar® VDC Relay Price List Series 801*

801-5-15-63 (66)

Description	Part No.	1- 24	25- 49	50- 74	75- 99	100- 249	250- 499	500- 999	1000- 2499
4 PST(NO)	801 - 4A	7.92	7.52	7.15	6.79	5.52	5.15	4.90	4.65
4 PDT	- 4C	8.58	8.14	7.73	7.35	5.89	5.58	5.31	5.05
8 PST(NO)	801 - 8A	10.45	9.90	9.74	8.93	7.15	6.79	6.49	6.13
8 PDT	- 8C	11.33	10.78	10.42	9.90	7.92	7.54	7.15	6.80
12 PST(NO)	801 - 12A	12.21	11.61	11.00	10.45	8.36	7.94	7.54	7.15
12 PDT	- 12C	13.09	12.43	11.83	11.22	8.97	8.53	8.10	7.70
16 PST(NO)	801 - 16A	19.14	18.21	17.33	16.45	13.20	12.54	11.90	11.33
16 PDT	- 16C	21.40	20.35	19.36	18.37	14.74	13.99	13.31	12.65
20 PST(NO)	801 - 20A	19.80	18.81	17.88	17.00	13.64	12.98	12.43	11.83
20 PDT	- 20C	22.44	21.34	20.30	19.25	15.40	14.63	13.88	13.20
24 PST(NO)	801 - 24A	20.52	19.47	18.48	17.60	14.08	13.37	12.71	12.05
24 PDT	- 24C	23.54	22.38	21.29	20.24	16.19	15.40	14.63	13.88
28 PST(NO)	801 - 28A	25.85	24.53	23.32	22.22	17.77	16.89	16.06	15.24
28 PDT	- 28C	29.15	27.72	26.35	24.42	19.53	18.54	17.60	16.72
32 PST(NO)	801 - 32A	26.53	25.19	23.93	22.66	18.15	17.22	16.39	15.57
32 PDT	- 32C	30.69	29.15	27.72	26.40	21.12	20.08	19.09	18.15
36 PST(NO)	801 - 36A	27.23	25.85	24.59	23.32	18.81	17.88	17.00	16.17
36 PDT	- 36C	31.72	30.14	28.60	27.17	21.78	20.68	19.64	18.65
48 PST(NO)	801 - 48A	33.94	32.24	30.63	29.10	23.54	22.39	21.29	20.29
48 PDT	- 48C	43.99	41.79	39.71	37.71	30.16	28.65	27.21	25.85
60 PST(NO)	- 60A	47.36	44.99	42.74	40.60	32.38	30.48	29.32	27.85

T-Bar VAC Relay Price List

4 PST(NO)	801-4A-115	12.87	12.21	11.61	11.04	8.92	8.24	7.71	7.21
4 PDT	-4C-115	13.53	12.84	12.19	11.60	9.29	8.67	8.12	7.61
8 PST(NO)	801-8A-115	15.40	14.60	14.20	13.18	10.55	9.88	9.26	8.69
8 PDT	-8C-115	16.28	15.48	14.88	14.15	11.32	10.63	9.96	9.36
12 PST(NO)	801-12A-115	17.16	16.31	15.46	14.70	11.76	11.03	10.35	9.71
12 PDT	-12C-115	18.04	17.13	16.29	15.47	12.37	11.62	10.91	10.26
16 PST(NO)	801-16A-115	24.09	22.91	21.79	20.70	16.60	15.63	14.71	13.89
16 PDT	-16C-115	26.35	25.05	23.82	22.62	18.14	17.08	16.12	15.21
20 PST(NO)	801-20A-115	24.75	23.51	22.34	21.25	17.04	16.05	15.24	14.39
20 PDT	-20C-115	27.39	26.04	24.76	23.50	18.80	17.72	17.69	15.76
24 PST(NO)	801-24A-115	25.47	24.37	22.94	21.85	17.48	16.46	15.52	14.61
24 PDT	-24C-115	28.49	27.08	25.75	24.49	19.59	18.49	17.44	16.44
28 PST(NO)	801-28A-115	30.80	29.23	27.74	26.47	21.17	19.98	18.87	17.80
28 PDT	-28C-115	34.10	32.42	30.77	28.67	22.93	21.63	20.41	19.28

(Continued on Next Page)

* An additional 10% will be added for all units requiring 6, 12, or 48 VDC coils on quantities of less than 250 pcs. except on 48 PST, 48 PDT, and 60 PST.

Terms: 1% 10 days, net 30 days, f.o.b. our plant, Wilton, Connecticut.

DANBURY ROAD, WILTON, CONNECTICUT
TELEPHONE 762-8351 (AREA CODE 203)

ELECTRONIC CONTROLS, INC.

T-Bar® VAC Relay Price List

801-5-15-63 (66)

<u>Description</u>	<u>Part No.</u>	<u>1- 24</u>	<u>25- 49</u>	<u>50- 74</u>	<u>75- 99</u>	<u>100- 249</u>	<u>250- 499</u>	<u>500- 999</u>	<u>1000- 2499</u>
32 PST(NO)801-32A-115		31.48	29.89	28.39	26.91	21.55	20.31	19.20	18.13
32 PDT	-32C-115	35.64	33.85	32.18	30.65	24.52	23.17	21.90	20.71
36 PST(NO)801-36A-115		32.18	30.55	29.05	27.57	22.21	20.97	19.81	18.73
36 PDT	-36C-115	36.67	34.84	33.06	31.42	25.18	23.77	22.45	21.21
48 PST(NO)801-48A-115		38.89	37.19	35.58	34.05	28.49	27.34	26.24	45.53
48 PDT	-48C-115	48.94	46.74	44.66	42.66	35.11	33.60	32.16	30.80
60 PST(NO)801-60A-115		52.31	49.94	47.69	45.55	37.43	35.43	34.27	32.80

T-Bar Toggle Switch Price List Series 802 (also Series 804 and 806)

4 PST(NO)802 - 4A		7.08	6.72	6.38	6.06	4.85	4.61	4.38	4.16
4 PDT	- 4C	7.74	7.37	7.00	6.66	5.30	5.04	4.79	4.55
8 PST(NO)802 - 8A		8.67	8.24	7.82	7.44	5.94	5.64	5.36	5.09
8 PDT	- 8C	9.81	9.32	8.86	8.42	6.73	6.39	6.07	5.78
12 PST(NO)802-12A		9.37	8.91	8.47	8.04	6.44	6.11	5.80	5.51
12 PDT	-12C	10.87	10.33	9.80	9.31	7.45	7.08	6.72	6.38
16 PST(NO)802-16A		16.30	15.51	14.80	14.04	11.28	10.70	10.16	9.69
16 PDT	-16C	19.17	18.25	17.34	16.46	13.22	12.55	11.94	11.33
20 PST(NO)802-20A		16.96	16.12	15.35	14.59	11.72	11.14	10.69	10.19
20 PDT	- 20C	20.22	19.24	18.27	17.34	13.88	13.19	12.51	11.88
24 PST(NO)802-24A		17.68	16.78	15.95	15.19	12.16	11.53	10.95	10.41
24 PDT	-24C	21.32	20.28	19.26	18.33	14.67	13.96	13.26	12.56
28 PST(NO)802-28A		23.01	21.84	20.79	19.81	15.85	15.05	15.05	13.60
28 PDT	-28C	26.93	25.62	24.32	22.51	18.01	17.09	16.23	15.40
32 PST(NO)802-32A		23.69	22.46	21.40	20.25	16.23	15.38	14.65	13.93
32 PDT	-32C	28.47	27.05	25.70	24.49	19.60	18.63	17.71	16.83
36 PST(NO)802-36A		24.39	23.16	22.06	20.91	16.89	16.04	15.26	14.53
36 PDT	-36C	29.50	28.04	26.58	25.26	20.26	19.24	18.26	17.33

T-Bar® Double & Triple Toggle Switch
Price List

<u>Description</u>	<u>Part No.</u>	<u>1- 4</u>	<u>5- 9</u>	<u>10- 24</u>	<u>25- 99</u>	<u>100- 249</u>	<u>250- 499</u>	<u>500- 999</u>	<u>1000- 2499</u>
48 PST(NO)802-48A		46.50	42.00	37.60	33.80	30.50	29.00	27.40	25.00
48 PDT	-48C	53.10	48.00	43.00	38.70	34.80	33.00	31.20	28.30
60 PST(NO)802-60A		58.00	52.10	47.00	42.40	38.20	36.30	34.60	31.10
60 PDT	-60C	66.60	60.00	54.00	48.50	43.70	41.50	39.40	35.40
72 PST(NO)802-72A		69.80	63.00	56.50	50.70	45.60	43.60	41.20	37.00
72 PDT	-72C	80.00	72.00	65.00	59.10	53.00	50.30	48.60	42.70

(Continued on Next Page)

Terms: 1% 10 days, net 30 days, f.o.b. our plant, Wilton, Connecticut.

DANBURY ROAD, WILTON, CONNECTICUT
TELEPHONE 762-8351 (AREA CODE 203)

ELECTRONIC CONTROLS, INC.


T-Bar® Double & Triple Toggle Switch
Price List

801-5-15-63 (66)

Description	Part No.	1- 4	5- 9	10- 24	25- 99	100- 249	250- 499	500- 999	1000- 2499
84 PST(NO) 802-84A		81.00	73.00	65.50	59.00	53.00	50.50	48.00	43.10
84 PDT -84C		93.00	83.60	75.50	68.00	61.20	58.00	55.00	49.50
96 PST(NO) 802-96A		92.60	83.50	75.00	67.50	60.50	57.50	54.60	49.30
96 PDT -96C		106.00	95.50	86.00	77.50	69.70	66.30	63.00	56.60
108 PST(NO) 802-108A		104.00	93.50	84.20	75.50	68.00	64.50	61.50	55.30
108 PDT -108C		120.00	108.00	97.00	87.80	79.50	75.50	71.50	64.50

T-Bar® Momentary Pushbutton Switch Series 803

Description	Part No.	1- 24	25- 49	50- 74	75- 99	100- 249	250- 499	500- 999	1000- 2499
4 PST(NO) 803-4A		5.46	5.18	4.93	4.69	3.75	3.56	3.56	3.21
4 PDT -4C		6.12	5.81	5.52	5.25	4.19	3.99	3.77	3.61
8 PST(NO) 803-8A		7.04	6.68	6.38	6.04	4.82	4.59	4.36	4.14
8 PDT -8C		8.18	7.77	7.39	7.03	5.62	5.35	5.08	4.83
12 PST(NO) 803-12A		7.74	7.36	6.99	6.63	5.30	5.04	4.79	4.54
12 PDT -12C		9.24	8.78	8.33	7.92	6.34	6.03	5.72	5.42
16 PST(NO) 803-16A		14.67	13.96	13.31	12.63	10.14	9.64	9.15	8.72
16 PDT -16C		17.55	16.70	15.86	15.07	12.11	11.50	10.93	10.37
20 PST(NO) 803-20A		15.33	14.56	13.86	13.18	10.58	10.08	9.68	9.22
20 PDT -20C		18.59	17.69	16.80	15.95	12.77	12.13	11.51	10.92
24 PST(NO) 803-24A		16.05	15.22	14.47	13.78	11.02	10.46	9.96	9.44
24 PDT -24C		19.69	18.73	17.79	16.94	13.56	12.90	12.25	11.61
28 PST(NO) 803-28A		21.38	20.28	19.31	18.40	14.71	13.98	13.31	12.63
28 PDT -28C		25.30	24.07	22.85	21.12	16.90	16.04	15.22	14.44
32 PST(NO) 803-32A		22.07	20.94	19.91	18.84	15.09	14.31	13.64	12.96
32 PDT -32C		26.84	25.50	24.22	23.10	18.49	17.58	16.71	15.87
36 PST(NO) 803-36A		22.76	21.60	20.57	19.50	15.75	14.97	14.25	13.56
36 PDT -36C		27.87	26.49	25.10	23.87	19.15	18.18	17.25	16.37

T-Bar Environmentally Sealed Relay Price Sheet for 831 and 831V (For 831V add 5% to Prices of 831 Listed Below)

Descript.	Part No.	1- 24	25- 49	50- 99	100- 249	250- 499	500- 999	1000- Up
11 PDT 831-11C-26.5		36.00	34.25	32.50	26.00	24.75	23.30	22.10
12 PDT 831-12C-26.5		39.60	37.62	35.73	28.58	27.07	25.71	24.42
23 PDT 831-23C-26.5		48.00	45.60	43.40	34.75	33.10	31.40	29.80
24 PDT 831-24C-26.5		52.80	50.16	47.65	38.12	36.21	34.39	32.67
35 PDT 831-35C-26.5		60.00	57.00	54.10	43.50	41.40	39.20	37.20
36 PDT 831-36C-26.5		66.00	62.70	59.56	47.64	45.25	42.98	40.83

Terms: 1% 10 days, net 30 days, f.o.b. our plant Wilton, Connecticut.

 DANBURY ROAD, WILTON, CONNECTICUT
 TELEPHONE 762-8351 (AREA CODE 203)

ELECTRONIC CONTROLS, INC.



T-Bar® Environmentally Sealed Toggle Switch Price Sheet

801-5-15-63 (66)

		1-	25-	50-	100-	250-	500-	1000-
Description	Part No.	24	49	99	249	499	999	Up
12 PDT	832-12C	39.60	37.62	35.73	28.58	27.07	25.71	24.42
24 PDT	832-24C	52.80	50.16	47.65	38.12	36.21	34.39	32.67
36 PDT	832-36C	66.00	62.70	59.56	47.64	45.25	42.98	40.83

T-Bar® Hermetically Sealed Enclosures

Series 808/808V Price List (For 808 Price, Reduce 808V Price Shown Below by 15%)

		1-	25-	50-	100-	250-	500-	1000-
Description	Part No.	24	49	99	249	499	999	Up
12 PDT	808V-12C	62.40	59.00	56.19	53.38	50.60	48.10	45.70
24 PST(NO)	808V-24A	85.60	81.30	77.10	73.20	69.50	66.00	62.65
24 PDT	808V-24C	106.25	101.00	95.80	91.00	86.40	82.00	77.98
28 PDT	808V-28C	147.30	140.00	133.00	126.30	120.00	114.00	108.30
34 PDT	808V-34C	147.30	140.00	133.00	126.30	120.00	114.00	108.30
36 PST(NO)	808V-36A	106.25	101.00	95.80	91.00	86.40	82.00	77.98
48 PST(NO)	808V-48A	147.30	140.00	133.00	126.30	120.00	114.00	108.30

NOTES (Series 808 and 808V)

Mating Connectors: Mating connectors for 808/808V series relays are not included in the above prices.

Ordering Information: Specify E-C-I P/N plus coil voltage required.

T-Bar® Connector Prices (TG-100-1)

P/N 88601 (1 to 499 Std. Pkgs.) @ \$1.25 ea.
P/N 88601-1 (1 to 499 Std. Ctns) @ \$27.60 ea.

(There are 24 Std. Pkgs. to a Std. Ctn)

Bulk Prices		500-2499	2500-Up	7500-49999	50M-Up
P/N 8601	Connector Block	@ 54.00/C	@ 48.60/C		
P/N 8601-1	Snap-In Contacts (Loose)			@ 25.00/M	@ 22.50/M
P/N 8601-2	Retaining Clips	@ 3.30/C	@ 2.97/C		
Labels (1-6) (7-12)		No Charge When Ordered With Block P/N 8601.			

Installation Tools

P/N 8601-51	Ratchet Tool	\$35.00 ea.
P/N 8601-53	Pneumatic Tool	\$465.00 ea.
P/N 8601-61	Extraction Tool	\$7.50 ea.
P/N 8601-71	Connector Tongs	No Charge with \$12.50 Connector order, otherwise \$1.00 ea.

Terms: 1% 10 days, net 30 days, f.o.b. our plant, Wilton, Connecticut.

DANBURY ROAD, WILTON, CONNECTICUT
TELEPHONE 762-8351 (AREA CODE 203)

GUIDE TO TYPICAL APPLICATIONS FOR INCREASING VERSATILITY
AND REDUCING COSTS IN:

COMPUTERS (Digital and Analog)

- Select Operate Mode
- Select Pre-Program
- Invert Logic
- Interface With or Equipment
- Select Displays
- Gate Buffers
- Select Memory Banks
- Calibrate Equipment
- Select Standby Equipment
- Clear Registers
- Select Signal Conditioners
- Connect Subscribers for Time Sharing
- Interface Hybrid Computer Sections
- Institute Self Check Modes
- Test Memory States
- Select Coding and Decoding Matrices
- Select Functions
- Connect to Data Transmitters

COMMUNICATIONS AND BROADCAST EQUIPMENT

- Interconnect Subscriber Equipment
- Fall-Back Switch for Self Checking Wire Line Transmitters
- Dataline for Sending or Receiving Parallel Digital Data
- Stand-By Switching for Maintenance
- Select Automatically Select Programs for Broadcast Studios
- Select Format for PCN Transmission
- Pre-Address Messages by Coding on T-Bar® Contacts which are then scanned Out Serially
- Switch Boards for Break-In Monitoring for Audio, Video or Digital Signals
- Parallel Line Multi-Bit X-Y Switching
- Studio Switching to Outgoing Lines
- Call all Stations in Intercoms

TESTERS AND INSTRUMENTATION

- Connect to Test Articles at Random or in Sequence
- Gate Comparators
- Institute Calibrate and Self Check Modes
- Scan Test Probes and Sensor Induced Signals including Thermo-Couples and Seismometers
- Select Function Individually or by Pre-Programming by Coding T-Bar®s and Scanning the T-Bar Sequentially
- For Remote Controls of Test Item Test Modes
- Select Reference Parameters
- Meter and Value Ranging
- Interface Switching to Recorders or Computers
- Test Status Lights
- Digitize Power Supplies
- Voltage Breakdown Test (For Sequential Shorting to Ground)
- Phase Invasion
- Time Share Costly Instrumentation in Consoles
- Select Outputs from Different Test Cells to Instrumentation

AIRBORNE SYSTEMS

- For Sharing Displays, Indicators, and Radio Equipment to Crew Members
- For Built In Self Checkout Systems (Functions Similar to those under TESTERS AND INSTRUMENTATION)
- For Facilitating Dual and Split Controls of Electrical Systems



MANUFACTURED BY:

electronic controls, inc.

T-Bar Switch/Relay Div. • Danbury Road, Wilton, Conn.

• (203) 762-8351